IS PROFESSIONALS IN A VIRTUAL IS CONTEXT: THE "TO DO WHAT?" COMPONENT OF A QUALITATIVE STUDY

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Abstract

The present paper plans shares the results of a study that was driven by the awareness that few activities and professions have seen such a rapid change over the past years as those related to the field of Information Systems (IS). According to these principles, this paper aims to present findings and propositions about the evolution of the context where these activities are performed, in order to contribute to the ongoing debate about IS professionals and IS function development. Despite the fact that the main concern of the global research project was people (IS professionals - the "who" part of the project) this paper is purposeful in the IS management activities (the IS function or the "to do what" part of the project).

Ontological and epistemological fundamentals of interpretative research based the research process. Theories and models were derived from the empirical material gained from near 30 leading experts from the IS area in Portugal, both academic and practitioners. Grounded theory has been used as supporting method and semi-structured interview was selected as a technique to collect data.

To understand the transformation process, forces that affect different IS dimensions have been identified and a dynamic model that supports IS context transformation is proposed. This model aims to explain how relations between different actors, IS tasks, roles and responsibilities have evolved and to predict scenarios in the present virtualized context where IS activities are performed.

Keywords: IS management, IS function, IS professionals.

1 INTRODUCTION

There is a growing awareness that few activities and professions have seen such a rapid change over the past years as the activities and professions related to the field of Information Systems (IS) (Lee et al., 1995). Furthermore, as business managers and end users became more aware of IS importance to their organization, increasing dissatisfaction is perceived, concerning the contribution of the IS function to the effective use and deployment of IT. Due to the above, significant pressure is being sensed towards new forms of IS management and related new roles of IS professionals.

Significant research has been conducted about these subjects and different aspects of IS activities have been analyzed. Some of these studies were concerned with the role, opportunities and risks of the IS function – and specially those of the Chief Information Officer (Earl and Feeny, 1995), (Applegate and Elam, 1992), (Bashein and Markus, 1998). Others were more concerned about how the IS function should be organized and evolve (Rockart et al., 1996), (Cross et al., 1997), (Peppard et al., 2000). During this period, a series of studies addressed the development of IS Human Resources, in terms of organizational needs (Heckman, 1998), (Lee et al., 1995) or in terms of Curriculum development, for which the IS'97 model curriculum from the ACM, AIS and AITP is a good example.

Most of the studies stressed the importance of further research in these areas due to the complexity and the moving nature of these subjects. But perhaps the most compelling argument to this study is that changes in the fundamentals of the IS function are being felt, making crucial to understand its real nature. Understanding the "to do what" will provide research with the basis to address the "who" part of the problem: impact on IS professionals, in their skills, competences and profiles.

2 RESEARCH PROBLEM AND APPROACH

This study identifies the main forces that are inducing the changes in the organizational context where IS are managed, and to understand how a changing context can impact the IS function's standing, in order to provide the fundamentals to a deeper analysis about competences, skills and attitudes needed by IS professionals to act accordingly new demands.

Several research questions were raised:

- What is the nature of the forces that affect the evolving context where IS activities are performed and what changes are they causing?
- What will be the impact of how IS are managed in the positioning of the IS function within the organizational structure?
- How will these impacts shape the expectations about IS professionals roles and behaviours in their organizations?

Due to the degree of uncertainty that applies to the future of IS activities and professions and the lack of accepted frameworks to anticipate IS function evolution, it was established that a more valuable contribution could be made if theory were derived from data obtained from fieldwork, with no previous preconceptions about the problem under research. In accordance with this, ontological and epistemological principles of interpretative research were found more suitable to the achievement of research goals.

The choice of an interpretive approach should not be seen as a hostility to or disagreement with positivist research, which is more common and widely accepted in the IS research arena (Orlikowski and Baroudi, 1991), but as a natural answer to the research purposes. Accordingly, no previous formulation of hypothesis was done and an open and non-biased approach to the research contributors was envisaged, as propositions were expected to derive openly from a continuous interplay between researchers and data (Strauss and Corbin, 1998).

3 RESEARCH DESIGN

Although no direct connection should be "naturally" granted - as often is stated - it should be acknowledged that some research methods and some techniques for data collection are more suitable than others to support the underlying philosophical assumptions of the researcher (Myers, 1997). In order to obtain significant data from the IS arena, information has been collected in Portugal from a group of 30 leading experts, that contributed with their experience, interpretations and views, during private interviews.

The diversity of original fields of the contributors (Academics, IS managers, RH managers, IS Senior consultants and IS Industry managers) reflects the "growing awareness in IS community that our subject domain is broader than we had first thought" (Galliers, 1998) and that a trans-disciplinary approach is required due to the complexity and speed of change that is related with today's problems.

"Semi-structured interview" was selected as the technique for data collection. Supported by a script that acts as "hidden agenda" to the interviewee, it allows the researcher to conduct the interview as a result of the interview process itself, rearranging the order and the deepness of the subjects, without loosing control (Oppenheim, 1992). All the interviews were taped for subsequently analysis and complete transcriptions were sent to each contributor.

During the research process, data obtained were continuously under analysis and new concepts and findings were introduced in the process, until "theoretical saturation" was reached, following the basic concepts of "grounded theory" (Strauss and Corbin, 1998). The NUD*IST software was chosen mainly because of its potential in indexing, searching and theorizing - the "IST" part of product's designation - and the connection to the identification of concepts, the creation of categories and the emergence of propositions that found a "grounded theory" approach.

4 CHANGES IN MULTIPLE DIMENSIONS OF THE IS CONTEXT

One of the most valuable findings in this phase of the research is that relevant forces were not only a direct result of identifiable trends in the IS field, (e.g. globalization, Internet expansion) but also a result of new perceptions and assumptions that players withdraw from these trends (e.g. assuming change and volatility as normal or bigger awareness on information issues and IS strategic thinking). In order to emphasize the true role of relevant forces, these are presented in their relation with IS context's dimensions that are influenced by.

4.1 The "expanding" horizontal dimension

The dissemination of business activities beyond the organization boundaries, involving both customers and suppliers, deeply changed the extent of IS intervention. With new approaches - such as Customer Relationship Management (CRM) and Supplier Chain Management (SCM) - and the emergence of new forms of inter-organizational relationships that are strongly dependent of IS support, the inside of the organization is no longer the sole playing arena for IS activities (Machado and Beira, 2001).

4.2 A rising vertical dimension

Transformation forces were also remarked towards the top of the organization, even if, as referred by the panel of interviewees, in a more gradual approach. First under the form of Decision Support Systems (DSS) or Executive Information Systems (EIS), later pulled-up by the development of "massive" technologies, such as Data Warehouses and Data Mining, it is notorious the growing importance of transforming operational data in business information.

It should be noticed, that the importance of this vertical force is amplified by the broadening of operational level and by the fact that it impacts directly high levels of management, affecting the way how top managers decide and, specially their mind-set about IT's role.

4.3 The strategic dimension

The presence of IT in the top management level can also be felt as the driver to change the way of conducting business or, even changing business itself, with a real intervention in the domain of business strategy (Galliers et al., 1999).

Actually, as assumed by an interviewee, "if the presence of IS in organization's strategy is showing to be important, it should be natural that decisions about IS strategy should be carried out by top management".

4.4 Complexity as normality

Nowadays organizations and IS professionals are accepting that complexity, diversity and permanent change are not the problem to solve, but the normal and positive way of managing: "an new ubiquitous era" (Applegate et al., 1996).

For instance, the growing number of business aspects under IS support and the increasing demand of "business thinking" in the IS solutions delivery process, which claims for an outstanding performance of the IS function in these domains and the involvement of multiple players, shows the characteristics of this complexity.

4.5 The importance of unstructured data and information

The growing awareness about unstructured data and information, that will probably introduce an all-new framework of IS activities and applications, in an unpredictable extension. This new scenario will establish significant challenges, that will be amplified by the present culture of IS professionals, which has been developed under the premises of structured information, analytical approaches and Cartesian accepted wisdom.

4.6 The IS services and external actors dimensions

To find "Outsourcing" and IS service providers in the IS context became more and more natural. As stated by one interviewee "In the uncertainty of IS domains, it is certain that we will use more external services, in a growing manner". This is not only happening in the traditional operational tasks, but also in the value-added domains, which increases dramatically the number of external actors in the IS stage.

4.7 The complex dimension "time"

As a significant finding, the only dimension of the IS context that was described by interviewees as a "shrinking" one was "time". To support these finding different perspectives were presented: the evidence that the time available to build and deliver new solutions is shorter; the fact that IS technologies and IS solutions have shorter life and demand for more changes in their lifetime and the fact that the gap between business and IS planning is becoming shorter, even disappearing.

5 A MODEL TO EXPLAIN THE TRANSFORMATION OF THE IS CONTEXT

As result of theorization process, some propositions referred that an evolutionary model - that normally supports natural development and growth of an entity - is not suitable to explain the fundamental transformation that is occurring in the IS context. In order to better support the nature of this transformation, a new model - that is only briefly described in this paper - is proposed.

This model is based in two time opposite representations of the IS context, with a transformation process supported by morphing principles.

5.1 The two representations of the IS context

The first representation is the Initial IS Context representation, which is obviously related with the way how Informatics appeared in organizations: A small number of tasks and responsibilities, with a technological focus, developed in a limited functional and physical environment – the IT department. As a result, a limited number of activities were performed, targeting the inside of the organization and having automation and efficiency as the major goals

On the opposite side of the model, the Final IS Context representation is present. This representation reflects a number of significant transformations and can be seen under three different and cumulative perspectives:

- The dimension and scope of the context;
- The nature of the activities;
- The way these activities are managed.

The dimension and scope of the context must be seen using a different scale, assuming a superior order of magnitude. At same time the nature of the activities progress extensively, not only in number but also in type, category, style, focus and goals. They are managed in different ways and can be

produced either inside or outside the organization, to satisfy internal or external demands. The management of these activities is assured in a virtual manner, with no explicit representation of functional ownership, as presented later. In Figure 1. the diversity of ways how tasks (T) and responsibilities (R), both internal and external, can be combined in order to assure activities (ACT), show the different nature and complexity of today's IS context.

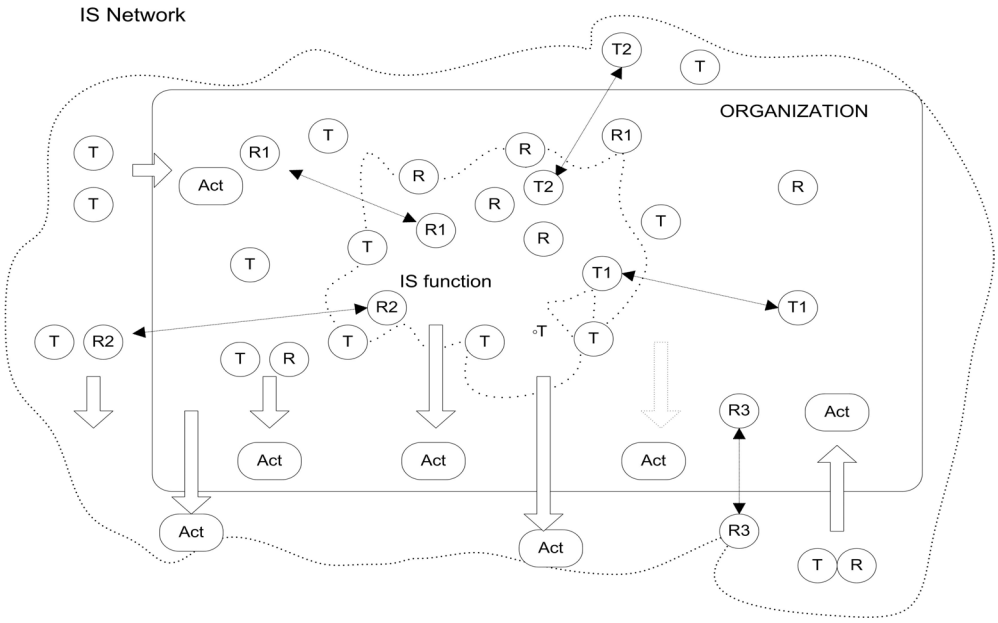

Figure 1. The Final IS context

5.2 A Morphing Process conducting to virtualization

Under the "morphing principles" a first representation is gradually replaced by a new representation, allowing the occurrence of new basic characteristics and the replacement of old. Appling these principles to the IS context, it is possible to identify the changing nature of IS activities, as presented in Table 1:

IS Activities	Initial Context	Final Context
Number	Reduced	High
Main Drivers	Technology , Support	Assorted natures
Organizational Scope	Operational, internal	Operational, tactic and strategic – internal and external
Actors	IT professionals mainly	Varied, both internal and external
Manipulated Object	Structured data	Multiformat Information – Structured and unstructured
Changing Pace	Slow	Very fast
Responsibilities and Tasks	A few and well defined	Diffused and shared: inside and outside
Organizational Representation	Existing (In the IS function)	Non-Existing (Virtualized)

Table 1. IS activities characteristics

5.3 Major consequences derived from the analysis of the Model

The interviewees frequently emphasized a growing virtualization of IS activities, as a growing number of actors outside IS organization, based on their importance and diversity, are developing a complex and borderless network that assures, nowadays, a significant part of IS activities (Heckman, 1998). As if a Meta-IS organization replaced the traditional IS function, but without being perceived, under no explicit strategy and carrying misconceptions about each others roles and responsibilities.

This effective "non-management" of IS activities appears as the real problem and the inevitability of developing a "new" IS function lined up with the characteristics of the "new" IS context was raised. Not in order to recapture all IS processes but in order to act as a keeper of the IS vision and to lead the "network of actors" in the pursuing of planned organizational goals.

6 ACTING AND MANAGING IN THE FINAL IS CONTEXT

From the findings presented here before and from subsequent and deeper analysis of the data gained during the research process, new propositions were deducted.

6.1 The separation of IT and IS functions

In order to implement a new IS function, the research process pointed towards the need to clarify roles in organization, namely of those that are directly related with the IT and IS management activities. According to this principle, the separation and definition of IT and IS functions were advised

6.2 The adoption of a multidimensional federal model

A multidimensional federal model to manage IS activities is proposed. It builds on a federal approach, were "equilibria" between centralization and decentralization, between relations and separations are permanently searched, all along what can be designated as the "continuum of decentralization". This permanent search doesn't seem to be an easy task but the effective management of these "equilibria" could be one of the differences between organizations that will prevail and those that will fail (Malone, 1997).

The multidimensional dimension of the federal model is imposed since the IS function will have to manage this federal relations and the search of theses "equilibria" with different stakeholders (i.e. top management, business units, suppliers, costumers and partners).

6.3 Rethinking the replacement and restructuring of basic units in IS organization

From the scenario described above, three propositions about the fundamentals of this dematerialized context emerged.

- The impracticality of expanding individual skills "ad infinitum", establishing the need to foresee IS professionals in the context of dynamic teams. Under these assumption, IS teams - not individuals - became the basic unit of IS organization.
- Due the growth of IS solutions complexity, it is difficult to assume a "tayloristic" approach to describe IS work, with sharply defined tasks. Accordingly, projects - not tasks - are suggested as the basic unit of IS work.
- IS professionals tend to integrate multiple projects, in an asynchronous manner, assuming different roles and applying different skills. In this scenario the ability of recombining skills from a dynamic portfolio is more important than the amount of skills itself.

A deeper analysis of new basic units - team, project and skills combination - shows two different components that support this change: a materialized one, which results from the aggregation of old

units – individuals, tasks and skills - and a dematerialized one, which grows from the relations that are established in between, as present in Figure 2.

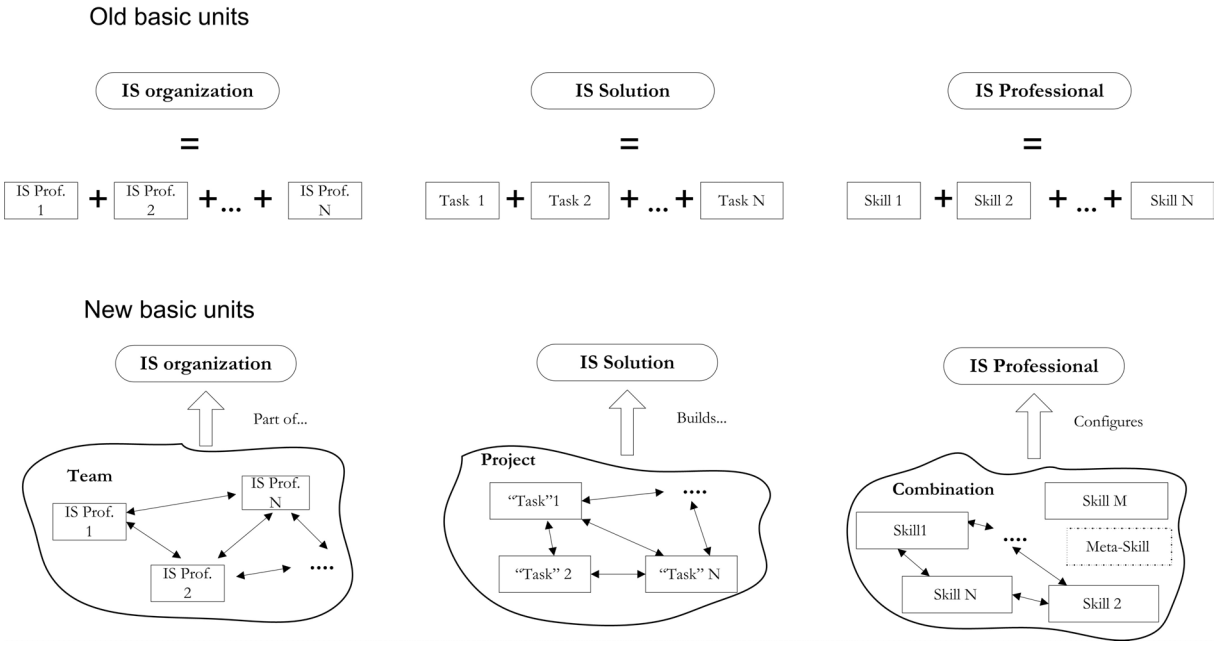

Figure 2. Old and new basic units

This different way of seeing reality, based on these new basic units, will conduct to new approaches in the discussion about IS professionals skills, competences and profiles.

7 CONCLUSIONS

The present research was designed to contribute with new propositions, theories and models, allowing a better understanding of IS function precedent behaviours and problems and an anticipation of scenarios and phenomena. The dimension and evolving nature of todays IS context have been drawn up from a conceptual model and contributions have been made in order to suggest and to assist transformation in terms of IS management. A multidimensional federal model to support a new IS function is presented and related ways of putting together IS basic units are proposed.

Being dynamical, this model will provide support to predict evolution and needs in a near future. The propositions presented - the "to do what" part - provide a sustained framework to support research questions concerning IS professional skills, competences and profiles: the "who" part of the project. Areas like organizational design, IS professionals management, curricula design and IS function development could benefit from the outcomes of this study.

In fact, IS professionals development and organization should be an important subject for future research, as suggested by present findings. Additionally, as the present study has been geographically limited, future research should expand the Portuguese borders, namely to address research questions under a European perspective.

Finally, as complementary outcome, the research was planned and conducted in a rigorous manner in order to contribute to the assessment of complementary research methodologies, which is expected to be lined up with the emerging acceptance of diversity in IS research approaches (Markus, 1997).

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